

Initial On-orbit Spatial Resolution Characterization of OrbView-3

- Science Systems & Applications, Inc. John C. Stennis Space Center, MS 39529
- permanent Stennis Space Center edge targets painted on a Acquired five OrbView-3 panchromatic images of the

Understanding among Orbital Sciences Corp., ORBIMAGE,

Inc., and NASA Applied Sciences Directorate.

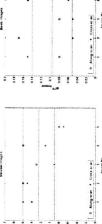
Characterization conducted under the Memorandum of

- Each image available at two processing levels: Georaw and
 - pixels are aligned by a nominal shift in the along-scan - Georaw is an intermediate image in which individual direction to adjust for the staggered layout of the

panchromatic detectors along the focal plane array.

Georaw images are engineering data and are not

- This product retains satellite geometry no rectification is Basic product includes a cubic interpolation to align the sensor artifacts, such as smile and attitude smoothing. pixels better along the focal plane and to correct for
- image sharpening, which is applied by default to OrbView-3 image products delivered by ORBIMAGE to customers. Processing of the characterized images did not include
- Edge responses were extracted from images of tilted edges in two directions: along-scan and cross-scan.
- Each edge response was approximated with a superposition of 3 sigmoidal functions through a nonlinear least-squares
- Line Spread Functions (LSF) were derived by differentiation of the analytical approximation.
 - Modulation Transfer Functions (MTF) were obtained after applying the discrete Fourier transform to the LSF.
- Average values of MTF at the Nyquist spatial frequency for five panchromatic acquisitions are as follows:
- 0.12 ± 0.04 for the Georaw images, and
- − 0.09 ± 0.04 for the Basic image products.



1	c		Crosser en	tmage No
**************************************			O Along scan +	-
3 5	\$ 5 us	2 0	-	

			order management of the	•
	1		- 1	
				-
٠				Image No.
	*************************************		Cross-scan	I traupe No.
	TO THE PARTY OF TH			Francis Mo.

1000			0	-	B00	0	٥	-		
8 0					90.0			•		
9 0					200					
0.00					9.07					
0	Mong-stan * Cross-strain	011-10-00			•	O Along tole	O Alongscom + Cross-dram			
	-	Smalps No.	,		6	-	Image No		-	
OrthVie	OrtView.3 nanchromatic images used for the enatial resolution characterization	omatic	mados	rod for	the eng	tial resol	uflon ch	ararterisa	201	
and the	and the results of these evaluations have as values of the Modulation Transfer	these e	valuation	works st	n as va	lues of th	e Moduli	ation Tran	ısfer	
ומוכוו	runction at the hyquist spatial frequency.	daist s	patial fre	daned		-		***************************************	-	
lmade		Satellite	Satellite Angle [*]	385	GSD [m]	Σ	TF at Nyqu	MTF at Nyquist frequency	'n	
Archive	Acquisition Date	Zenith	Zenith Azimuth	Cross.	Cross- Along- scan scan	Cross. scan (Georaw)	Cross- scan (Bas/c)	Along- scan (Georaw)	Along- scan (Basic)	
14442	09/17/03	107	845	1.02	66.0	0 16	0.15	0.14	80.0	_
24700	CONCENTE	24.0	0007			20.00	200	0,0		

High Spatial P

Panchromatic Images	Mynist inquired Mynist	Proposite framework proposite framework framew	20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Physical hearnery hyperal hearnery (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
Panchro	Moditive Name of the control of the	malcount bewerds only	On Supplied	MICHALIN Beards and	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
	Consumer Control of Co	Description of Language Langua	200 C C C C C C C C C C C C C C C C C C	200 200 200 200 200 200 200 200 200 200	200 200 200 200 200 200 200 200 200 200
-	3	1-1-	-1-	1-1-	1-1-